were discovered, and their importance appreciated, by van Beneden.

Finally, and this, perhaps, is the greatest discovery associated with his name, he showed, in 1883, that in the last gametogenic divisions by which the ovum is produced, the number of chromosomes of the nucleus becomes reduced to one-half the original number, and the like fact for the spermatozoon was discovered in 1884 by him, working in conjunction with C. Julin. Though it cannot be asserted that he was the first to give a complete account of the morphology of fertilisation, yet it may fairly be said that he went as near to that as any other worker, and that he was one of the three zoologists whose discoveries led to the complete elucidation of that phenomenon. Lastly, we must not forget to mention that he founded and edited the *Archives de Biologie*, in which some of his most important work was published.

Van Beneden was a strikingly handsome and distinguished-looking man. His splendid figure will not readily be forgotten by those who were present at the Darwin centenary celebration at Cambridge last year. He was a keen and active sportsman, and his proclivities in this direction often led him far afield—to Sweden for reindeer and, as we have seen, to Switzerland for climbing. He was a lauréat and correspondant of the Institut de France, correspondant of the Acadamies of Berlin, Vienna, and St. Petersburg, foreign member of the Academy "Dei Lincei" of Rome, and an honorary member of many other similar institutions in different parts of the world. He was an honorary doctor of many universities, including those of Oxford and Cambridge, and had many other titles and honours. A. S.

NOTES.

THE next meeting of the Royal Society will be held on Thursday, May 26, when the Croonian lecture will be delivered by Prof. G. Klebs on "Alterations of the Development and Forms of Plants as a Result of Environment."

OWING to the lamented death of King Edward, the Chemical Society's banquet to the past-presidents who have completed their jubilee as fellows has been postponed from May 26 to the autumn. We are also asked to announce that the conversazione of the Entomological Society of London, fixed for Friday, May 27, is postponed indefinitely.

THE annual May lecture of the Institute of Metals will this year be delivered by Prof. Gowland, F.R.S., vice-president of the institute, who will take as his subject "The Art of Working Metals in Japan." The lecture will be given on Tuesday, May 24, at 8.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W. Tickets admitting visitors may be had gratuitously on application to the secretary of the institute, Mr. G. Shaw Scott, Caxton House, Westminster, S.W., to whom applications should be made not later than Saturday next.

Two meetings—the first with Lord Verulam in the chair—were held on Friday in St. Albans to support the scheme of the society for excavating the site of Verulam during the ensuing summer and autumn. The site covers close on 200 acres, and although the Roman walls and other buildings were used as a quarry in obtaining materials with which to construct St. Albans Abbey, the greater part of Verulam is unique in that it has never been built upon. The beheading of the proto-martyr Alban, together with other circumstances, suggests that remains of early Christian churches may be discovered; and, in any case, the theatre and forum are known to have been larger than any other similar buildings in England.

ON Tuesday, May 24, Prof. Love will begin at the Royal Institution a course of two lectures on "Earth Tides," the second to be delivered on Monday, May 30, and on Thursday, May 26, Dr. W. Rosenhain will deliver the first, and on Wednesday, June 1, the second, of two lectures on "Alloys"; on Friday afternoons May 27 and June 3 Dr. D. H. Scott will deliver the remaining two of his course of three lectures on "The World of Plants before the Appearance of Flowers." The Friday evening discourse on May 27 will be delivered by Captain R. F. Scott on "The Forthcoming Antarctic Expedition," and on June 10 by Dr. H. Deslandres on "The Progressive Disclosure of the Entire Atmosphere of the Sun" (in French).

FRANCE seems inclined to follow the example of Prussia in forming a Government Department for the Preservation of Natural Monuments. Last October an International Congress for the Protection of Landscape was held in Paris, the German Ambassador being one of the vice-presidents. The Prussian organisation for the preservation of nature—the term "Natural Monuments" referring to natural scenery and indigenous fauna and flora—was highly praised by French men of science, and it was proposed to take steps for the institution of a similar system in France. Prof. Miyoshi, of Tokyo, in a brochure laid before the conference, speaks highly of the Prussian movement, and invites Japan to take a similar precaution. Prof. Kumm, of Danzig, illustrated the working of the statute against disfiguration of scenery. Of particular interest was Dr. Hermann's paper on natural parks for the protection of animal and plant life, which have long been a German institution. The second Conference for the Preservation of Natural Monuments in Prussia has also just been held at Berlin. It is worth remark that the German Press and public take a keen interest in this useful work. There is, we may add, plenty of scope for such work in the United Kingdom; but it must be done soon, before the building speculator and the municipal engineer have quite exterminated nature in these islands.

THE number of *L'Anthropologie* for March-April, under the title of "Les Sofs chez les Abadhites," of North Africa, contains the first portion of an important study of tribal sociology by Dr. J. Huguet. The vague term Sof is defined by the writer as "the reunion of all those individuals who, by reason of community of origin, needs, and political interests, have been forced to associate for purposes of attack and defence." The political influence of associations such as these has recently attracted much attention from the officers responsible for the control of these often unruly tribes.

IN the May issue of *Travel and Exploration* Miss E. C. M. Browne describes an adventurous journey by two ladies to the famous sacred lake Manasarowar, in Tibet, which has been hitherto visited only by a comparatively small number of Europeans. Evidently recent British action in Lhasa has borne fruit so far west as Manasarowar. The head Lama of the local Gomba was very friendly, and went so far as to allow the Bhotiya coolies following the camp to shoot birds in the holy waters, an unusual concession on the part of a Tibetan Buddhist, who, in theory at least, is much opposed to taking animal life.

IN *L'Anthropologie* for March-April MM. E. Cartailac and l'Abbé H. Breuil continue their survey of the paintings and engravings found in the caves of the Pyrenees. The caves described in this article are those of Gargas, not far from Montrejeau, and Bédailhac and Pradières, near Tarascon. The first of these contains a remarkable series of paintings and engravings, depicting hand-marks, animals such as the elephant, bison, horse, and what seems to be a rude human figure, resembling other European specimens of Palæolithic art, as well as that of the natives of Australia and the South African Bushmen. A similar collection of examples of primitive art from caves once occupied by Bushmen on Mt. Silozwana is described by Messrs. Mennell and Chubb under the title of "Some Aspects of the Matopos" in the first part of vol. viii. (1908) of the Proceedings of the Rhodesia Scientific Association, just received. The figures of the giraffe, guinea-fowls, and flying ants are particularly realistic, and supply excellent examples of primitive native art.

THE Choctaw of St. Tammany Parish, in Louisiana, the now scanty remnants of a once famous tribe, are described by Mr. D. I. Bushnell, jun., in the forty-fifth Bulletin of the Smithsonian Institution. They have now forgotten most of their characteristic industries—pottery and basket-making—and have lost the art of fishing, most of their needs being supplied from the nearest store; but though they have been for a long period subjected to Christian influences, they retain many of their primitive beliefs. Thus a solar eclipse occurs when the sun is resting and cleaning himself from the accumulated smoke of his fires. Thunder and lightning are produced by two great birds, and when the female is laying an egg in her nest in the sky there is a thunderclap. The good spirit, Aba, takes to his heaven the spirits of all tribesmen save those dying by effusion of blood and murderers. The evil spirit, Nanapolo, wanders in the recesses of the forest, and though he is feared, he never succeeds in gaining possession of the soul of a Choctaw. They have practically lost their belief in witchcraft, and have never assimilated the practices of Voodooism, so popular among the negroes around them. Mr. Bushnell has excavated a series of mounds which throw some light upon their primitive culture.

THE great flights of crossbills which visited this country and the Continent last summer and autumn have, in our islands at any rate, remained in many places to breed. In the May issue of Witherby's *British Birds* a large number of instances of such nesting are recorded, and it is confidently expected that many more will follow. The localities include the Southampton district, Wickham, the New Forest, Kent, Staffordshire, Suffolk, Surrey, and Sussex. The nests were mostly, or invariably, built in Scots firs, those near Burley, in the New Forest, being placed in the forks of horizontal boughs at a height of some 30 feet from the ground and a dozen feet from the stem. It is suggested that an unusual abundance of Scots-fir seeds may have led to the visitation.

DR. K. DENINGER, in vol. xviii., part i., of the *Berichte d. Naturfor. Gesellschaft zu Freiberg*, has done good service in demonstrating the marked distinction between the babirusa of Boru and its relative of Celebes. The original *Sus babirussa* of Linnæus came, it appears, from Boru, but the *Babirussa alfurus* of Lesson's "Mammalogie," which was supposed by its describer to come from the same island, and to be identical with the Linnean species, is based on Celebes specimens. For the Boru species Dr. Deninger takes the name *Babirusa babirusa*, while for its Celebes representative he proposes the new title *B. celebensis*, although in our opinion he ought to have retained Lesson's *B. alfurus*. Until the author brought home specimens, the Boru babirusa seems to have been represented in European museums only by a few skulls, the distinctive peculiarities of which were not recognised. It is distinguished by its nearly smooth hide, of which the colour in adult males is greyish-brown above and light brown below, and also by the thick coat of short bristly hairs, which becomes thickest at the root of the tail. The general colour is whitish-grey, tinged, especially on the head, with yellow. Females and young males are darker. The Celebes species, on the other hand, has the well-known rugged and furrowed hide almost naked, and brownish-grey in colour. The skull of the Boru babirusa is short and wide, with the extremities of the nasals not narrowing to a sharp point between the sheaths of the upper canines in the manner characteristic of its relative in Celebes, and there are also differences between the tusks of the two species. Dr. Deninger, who adopts Stehlin's theory that the bunodont dentition of the Suidæ is derived by degeneration from a selenodont type, concludes by expressing the opinion that Babirusa is nearly related to the Siwalik Merycopotamus, both genera agreeing in the parallel direction of the two lines of cheek-teeth, the general form and small size of the crowns of these teeth, the shape and direction of the tusks, and certain other features.

THE Board of Agriculture has taken advantage of the powers conferred upon it by the Destructive Insects and Pests Acts, and has issued an order affecting the following:—The vine louse (*Phylloxera vastatrix*, Planchon), the San José scale (*Aspidiotus perniciosus*, Comstock), the Mediterranean fruit fly (*Ceratitis capitata*, Wiedemann), the Colorado beetle (*Doryphora decemlineata*, Say), the large larch sawfly (*Nematus erichsonii*, Hartig), the potato moth (*Lila solanella*, Boisduval), the gipsy moth (*Liparis* [*ocneria*] *dispar*, Linné), the brown tail moth (*Euproctis chrysorrhoea*, Linné), the nun moth (*Liparis monacha*, Linné), the cherry fly (*Rhagoletis cerasi*, Linné), the narcissus fly (*Merodon equestris*, Fabricius), black knot (*Plowrightia morbosa*, Saccardo), wart disease or black scab of potatoes (*Synchitrium endobioticum*, Percival), tomato-leaf spot (*Septoria lycopersici*, Spegazzini), melon or cucumber canker (*Mycosphoerella citrullina*, Grossenbacher), and American pear blight (*Micrococcus amylovorus*, Burrell). Under the provisions of the Act any person selling or planting any seed, cutting, plant, &c., attacked by any of these pests is liable to a penalty of 10*l*. A like penalty is incurred if anyone fails to notify the proper inspectors when any of the pests appear in his garden, or if he omits to carry out the measures specified by the Board for the prevention of the spread of the pest. The inspector may enter any premises where he has reason to suppose one of these pests occurs and examine any plants. He may go further, and order the destruction of the plants affected if the local authority consents to pay compensation. This is the part of the Act that has been most criticised, and it still remains to be seen how much good is done when the most effective, if also the most drastic, method of treatment may be excluded. But the order shows that the Board is alive to the necessity for action, and it will no doubt discover a way of getting over this particular difficulty. If the order constitutes a new terror for amateur gardeners and careless nurserymen it also emphasises the necessity for horticultural instruction in the schools, and justifies the evening classes held in many of the counties.

A CURIOUS manna-like incrustation or wax collected on twigs and leaves of *Elaeodendron glaucum* is described by

Dr. D. Hooper in the Journal of the Asiatic Society of Bengal (vol. v., No. 9). It has been identified as the secretion of *Phromnia marginella*, an insect passing in India under the name of the ghost bug. The substance contains sugar in the form of dulcitol, which the author refers to a special secretion in the plant.

An article in Engler's *Botanische Jahrbücher* (vol. xliv., part i.) by Dr. R. Knuth, on the formation of hybrids in the genus Pelargonium, should be interesting to horticulturists and botanists alike. The large number of Pelargonium hybrids contrasts greatly with the three hybrids known for Geranium and two for Erodium. It is strange to find that five sections of the genus furnish no hybrids, while crosses between species in different sections are not uncommon. The author remarks that, as a rule, there is no fusing of parental characters, but more often one supplies the leaf and the other the flower characters in the hybrid. The "English" pelargoniums, known in this country as decorative or fancy, are attributed to crosses between *grandiflorum* of the section Polyactium, and the species *cucullatum*, *cordatum*, and *angulosum* of the section Pelargium. Dr. Knuth recognises the excellent work of English horticulturists, and places a high value on the classic work of Sweet on the Geraniaceæ, published in 1815.

The composition of Indian rice has been investigated by Mr. David Hooper, and the results are published as No. 5 of the *Agricultural Ledger*. Rice cultivation is the most important of the agricultural industries of India, more than seventy million acres being annually under this crop. There are a number of varieties of grain differing in size, shape, colour, and other properties, not all being equally suitable for culinary purposes. Thus a variety known as *kauk-nyin* is so glutinous that it will not stand the boiling required by ordinary rice, but is made into various kinds of puddings and sweetmeats. It is frequently boiled in bamboo tubes, to be eaten cold by travellers; when required, the bamboo is peeled off, and a long roll of rice appears which forms a palatable substitute for bread. Taking the 159 samples as a whole, the percentage of carbohydrate varied between 92·2 and 82·2, of protein between 11·4 and 6·06, of fat between 3·6 and 0·11. The fibre rarely exceeded 1 per cent., and was usually round about 0·5 per cent.; the ash usually fluctuated between 0·5 and 2 per cent. This series of analyses of rice is probably the most complete that has yet been executed.

Prof. R. Marek contributes an important paper on the position of the upper limit of the forest growth in the eastern Alps, and its relation to the elements of climate, to Petermann's *Mitteilungen* (p. 63). The general conclusion arrived at is that the importance of mean atmospheric temperature has hitherto been greatly overestimated, and that such factors as rainfall and direction and force of wind are essential causes determining the altitude of the forest line.

The Proceedings of the Royal Society of Edinburgh (vol. xxx., p. 183) contain a paper by Dr. W. A. Caspari, of the *Challenger* Office, on the composition and character of oceanic Red Clay. Dr. Caspari gives the results of analyses of thirteen samples of Red Clay obtained from the different oceans in depths varying from 1900 to 3100 fathoms, and discusses the peculiarities of each. It is established, generally, that Red Clays originate, in the main, from the degradation of acid and basic volcanic glasses, and that the chemical processes involved cannot differ in essence from those associated with the subaërial weathering of silicates. A feature of deep-sea "weathering" is that it takes place under conditions which admit of finality; in the Red Clay areas there is a temperature of 1° C. to 3° C., a pressure of 400 to 600 atmospheres, and a uniform medium, sea-water, which have scarcely changed for millions of years. As a result, a degradation product of much the same composition is found all over the globe, and it is to be observed that it is a more acid silicate than the corresponding continental material.

The Bulletin of the Philippine Weather Bureau for August, 1909 (recently received), contains an interesting note on the frequency of local earthquakes in relation with atmospheric pressure in Manila in 1902–8. As "local earthquakes" are designated the so-called instrumental earthquakes the records of which traced by the microseismograph show that their point of origin was in the locality, or very close to it. During the years under consideration 796 such disturbances were recorded at the observatory, and a table showing graphically their mean hourly frequency exhibits clearly two principal maxima and minima, and one secondary maximum and minimum. When this curve is smoothed by showing the frequency for three-hour periods, its parallelism with that of the double daily oscillation of atmospheric pressure shows that "at Manila the highest pressures are more favourable to the occurrence of instrumental earthquakes than low pressures." Prof. F. Omori, the eminent seismologist, has attributed the reason of such parallelism to the fact that in all probability these local earthquakes have their origin at very shallow depths, and may be closely connected with daily changes of pressure exerted by the atmosphere on the earth's crust (see Bulletin of the Imperial Earthquake Investigation Committee, Japan, vol. ii., p. 105).

"The Cause of the Vertical Movements in the Atmosphere" is the title of an interesting paper by Prof. W. Trabert in the *Sitzungsberichte* of the Vienna Academy of Sciences of December 2, 1909. The inquiry is based upon the observations of the upper air made at Lindenberg during the month of January, 1909. The diagrams, which exhibit, *inter alia*, the isotherms and lines of equal potential temperature up to an altitude of 5000 metres, show that at times tongues of low temperature extend downwards from the upper regions, and that others of higher temperature extend from below upwards, so that areas of high and low temperatures become intermingled. Among the results arrived at we may mention the following:—In a warm column of air the movement is upwards, and *vice versa*. The ascending movement causes the air-pressure to fall, and conversely. If cyclones and anti-cyclones are thus caused, the air already cooled is dynamically carried higher up, or the warmed air transferred further downwards, causing fresh vertical motion; the origin of cyclones and anti-cyclones is therefore thermic and dynamic. The pendulum-like upward and downward movement of the air is due to aqueous vapour, and the latent heat set free by its condensation furnishes the energy for the maintenance of the vertical circulation.

The importance of the coherer as a detector in radiotelegraphy amply justifies the large amount of attention which has been paid to it by experimenters during the last few years. Attention has been directed in these columns to the work of Mr. G. W. Pierce (*Physical Review*, vol. xxix., and references there) and of Mr. L. W. Austin (Bulletin of the Bureau of Standards, vol. v.). In the *résumé* of communications made to the Société française de Physique on March 18 there are abstracts of two further papers by M. Tissot and M. Blein respectively. Both direct attention to the influences of the thermoelectric properties and the variation of the resistance with temperature of the materials used on their behaviour as coherers, but Dr. W. H. Eccles, in a paper read before the Physical Society of London on March 11, showed that the whole of the properties of coherers could be explained, both qualitatively and quantitatively, by the Joule and Peltier heat generated at the junction, and its effect on the resistances of the materials forming the contact.

Vol. vi. of the "Collected Researches of the National Physical Laboratory" contains 200 pages quarto, and consists of reprints of fourteen papers by members of the staff which have appeared in the pages of the technical Press or the proceedings of scientific societies, most of them during the year 1909. Several of these papers have already been noticed in these columns, but we should like to direct attention to the report of the committee appointed by the Institution of Naval Architects to carry out the scheme for establishing a tank at the laboratory in which the experiments necessary for the advance of British shipbuilding might be carried out. Ten experimental tanks are already in use throughout the world, Japan possessing one, but most of them are owned by private firms. An advisory committee of naval architects has been appointed, which will draw up a scheme of work to be done in connection with the problems now awaiting solution.

A specimen bottle of a concentrated combined toning and fixing bath, issued under the name of "Combino," has been sent for examination by Mr. P. F. Visick, 30 Finland Road, Brockley. It gives good colours, and as it is only necessary to place the print as taken from the frame into the solution until the desired colour is obtained, it makes the use of ordinary silver printing-out paper as simple as the self-toning papers now so common. It is a gold-toning solution, and the maker claims that it is stable when either concentrated or diluted for use, and that double-toning, that is, a variation of colour according to the depth of the printing, is impossible. It is issued in 4-oz. bottles at one shilling, and is diluted to five times its bulk for use.

The changes undergone by stored coal are of considerable importance, both from the point of view of liability to spontaneous combustion and loss in calorific value. A recent Bulletin (No. 38, Series 1909) from the University of Illinois Engineering Experiment Station, by Messrs. S. W. Parr and W. F. Wheeler, is devoted to the consideration of this subject. A critical abstract of all the earlier work on the weathering of coal is given. This is followed by a detailed account of experiments made to determine the amount of disintegration and the changes in weight and calorific value occurring in the grades of coal found in Illinois and in the neighbouring States under different conditions of storage. The losses in calorific value for coal stored under water were found to be less than with the usual storage in air, but the differences were not great enough to warrant any changes in present storage methods from this point of view alone. Storage under water gives protection against spontaneously ignited fires, and also lessens breakage losses, and hence may be worth while resorting to in certain cases.

Messrs. Reynolds and Branson, Ltd., have just issued a comprehensive catalogue of photographic requisites containing particulars of many new cameras and accessories.

A work on the birds of Dumfriesshire, by Mr. H. S. Gladstone, will shortly be published by Messrs. Witherby and Co. The book will give an exhaustive account of the present-day status and past history of all the birds of the county, and will be illustrated by photographic plates and a map. It will be published by subscription, and in a strictly limited edition.

An Aviation Association of Ireland has been formed, with Mr. J. B. Dunlop as president, Dr. W. E. Lilly and Mr. J. C. Peary as vice-presidents, and Mr. D. O'B. Gill, 19 Herbert Street, Dublin, as honorary secretary. A lecture was delivered before the association on February 8 by Dr. Lilly, and has now been reprinted by the *Motor News*, of Dublin.

Messrs. J. and A. Churchill have a new edition of vol. ii. of "Allen's Commercial Organic Analysis" just ready for publication. This volume has been re-written under the editorship of Dr. H. Leffmann and Mr. W. A. Davis. The subjects are:—fixed oils, fats and waxes, special characters and methods, butter fat, lard, linseed oil, higher fatty acids, soap, glycerol, cholesterols, wool fat and cloth oils.

A new catalogue of lenses has just been issued by Messrs. J. H. Dallmeyer, Ltd. Among the new types of lenses of which particulars are given are a new series of Dallmeyer stigmatics, the single components of which are dissimilar and may be used separately; improved forms of the well-known "Adon" lens, which gives, for the same camera extension, a much larger picture than an ordinary lens; and a new telephoto combination working at *f*/10, and giving variable magnification. The capabilities of the various lenses and combinations are illustrated by some striking pictures.

OUR ASTRONOMICAL COLUMN.

Halley's Comet.—The observations of Halley's comet during the present month have shown that, in brightness, it has at least come up to general expectation. Numerous amateur observers report having seen it as a fairly conspicuous object before dawn.

If Dr. Ristenpart's calculated time for perihelion is correct, the comet transitted the sun between 3h. 4m. and 4h. 4m. this morning (May 19), and any special phenomena which could be caused by the passage should be fully reported to some competent authority. From Dr. Holetschek's results it appears likely that the brightest part of the tail would not extend so far as the earth, but meteors from the outlying, and possibly curved, extremity should be looked for, carefully noted, and reported. Recent observations indicate, however, that the tail is quite long enough to extend past the earth.

Mr. G. Gillman reports that he has continued his observations at Aguilas, Spain, on each successive morning, and found that at 3h. 20m. on May 13 the tail was particularly well defined. It was visible to the naked eye almost to a line joining θ Pegasi and α Aquarii, which means that the apparent length was some 43°. This is the greatest length yet recorded by him.

Mr. C. Leach also sends another sketch showing the extent of the tail as he saw it with the naked eye at 3h. 45m. a.m. on May 8. This shows the head of the comet in line with α Andromedæ, γ Pegasi, and Venus, with the tail extending, nearly parallel to the south side of the Great Square, to a greater length than the distance between γ and α Pegasi; the tail was perfectly straight. Mr. Leach also sends a sketch and note, taken from a local paper, describing the comet as seen by Prof. Attilio Sesta, at Palermo, at 3h. 25m. on May 8. This corroborates Mr. Leach's own observation, and adds that the nucleus was very bright (visible until 5 a.m.), and that the diaphanous tail exhibited rectilinear margins which formed a small angle at the head.

A number of positions of the comet during November-February are published by Dr. Rambaut in the Monthly Notices (lxx., 6). The places were determined from photographs, taking astrographic stars for reference points.

In *Astronomische Nachrichten*, No. 4408, Herr J. Franz considers the passage of the earth through the tail and